

REMARKS/ARGUMENTS

Reconsideration of this application in light of the above amendments is courteously solicited.

Initially the undersigned would like to thank Examiner Richman for the courtesies extended during an oral hearing held with the undersigned on May 6, 2004. During the above mentioned oral hearing, the outstanding official action was discussed in detail and agreement was reached as to how to amend the claims so as to comply with formal requirements of 35 U.S.C. 112, second paragraph.

Applicant submits herewith a substitute specification which conforms with the requirements of U.S. practice. In addition, Applicant has cancelled previously submitted claims 1-10 in favor of new claims 11-17. It is submitted that claim 11 and the claims which depend therefrom patentably define over the art of record.

The present invention is drawn to a fitness apparatus as set forth in new independent claim 1. The fitness apparatus comprises an actuating means (2) for receiving an applied force (F) from a user of the fitness apparatus. Drive means (3) produces a load on the actuating means in opposition to the applied force. The sensor means (5) continually senses the applied force (F) applied by the user and varies the load (3) on

the actuating means (2) in response to sensed variations in the applied force (F). The foregoing arrangement is not taught or suggested by the prior art cited by the examiner, namely, U.S. Patent 5,618,245.

The '245 patent discloses a method and apparatus for maintaining heart rate of a user of fitness equipment. The load (resistance) on the fitness equipment is adjusted in response to the heart rate of the user which is sensed by a heart rate sensor. This arrangement is totally different from the claimed fitness apparatus of the present invention. In accordance with the present invention as set forth in independent claim 11, the sensor continually senses the applied force applied by the user and varies the load (resistance) in response to variations in the applied force. In light of the foregoing, it is respectfully submitted that claim 11 as amended patentably defines over the art of record.

An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the

Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

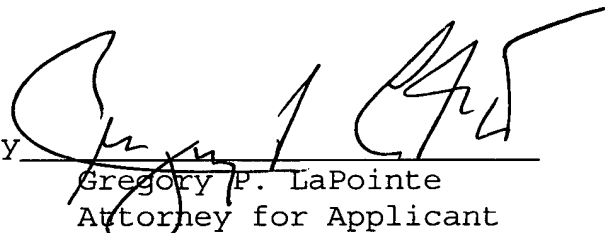
It is submitted that the claims as amended herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

Respectfully submitted,

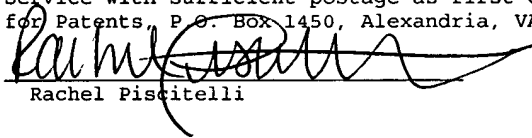
Hans-Hermann Spohr

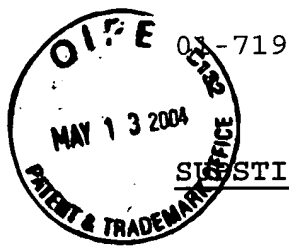
By


Gregory P. LaPointe
Attorney for Applicant
Reg. No. 28,395
Tel: (203) 777-6628
Fax: (203) 865-0297

Date: May 11, 2004

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313" on May 11, 2004.


Rachel Piscitelli



SUBSTITUTE SPECIFICATION WITH MARKINGS

Arrangement for controlling a device, such as items of fitness
equipment for example

BACKGROUND OF THE INVENTION

[0001] The invention relates to an arrangement for controlling a device, in particular items of fitness equipment, items of equipment for motion therapy or the like, having at least one actuating device which can be moved about and/or along an axis, a drive being assigned to the device for producing an active load.

[0002] Such arrangements are known and are common on the market in a wide variety of forms and designs. They are known in the field of motion therapy and also in the fitness sector. For example, items of fitness equipment are known in which the load can be simulated but has to be set manually.

[0003] In this case, the loads are often changed manually or during operation in corresponding items of training equipment, a factor which is undesirable.

[0004] In addition, it is often not possible for the patient or user to permanently influence his sequential training process, in particular during renewed treatments.

[0005] In particular, it is very time-consuming and costly to record a completed training program and modify or adapt it to a future training program or a future therapy. To this end, a large number of personnel are necessary, which is likewise undesirable.

[0006] A system for motion therapy with a crank is described according to DE 39 02 059 A1, it being possible for this crank to be driven or braked with arms or legs. In this case, torques or forces are determined indirectly by measuring the motor current, which is driven.

[0007] The object of the present invention is to provide an arrangement for controlling a device, such as for example items of fitness equipment, items of equipment for motion therapy, with

which the above-mentioned disadvantages are removed and which permits a therapy, in particular a motion therapy, and also fitness training and which is simple to adapt individually during operation and also for subsequent therapies.

[0008] Furthermore, in particular costs and personnel costs for the modification of therapies, in particular motion therapies, are to be saved.

SUMMARY OF THE INVENTION

[0009] ~~This~~ The foregoing object is achieved by virtue of the fact that the at least one actuating device can be driven for simulating the active load, and, for continuously and permanently detecting, in particular measuring, a manual ~~load~~ force applied externally to the device, in particular the actuating device, a sensor, in particular a force sensor, is assigned to the device and/or the actuating device and/or the gear unit.

[0010] In the case of the present invention, an arrangement is provided in which an actuating device for simulating an active load can be driven electrically for carrying out a translational and/or rotational movement for a user.

[0011] In this case, a drive, in particular an electric motor, is used in order to move the actuating device in a rotational and/or translational manner, as described, for example, in German Utility Model DE 299 17 818.8. Reference is expressly made to the contents of said utility model; it is to be an integral part of the present invention.

[0012] Described in this publication is an arrangement for controlling an apparatus, such as, for example, an aircraft, aircraft simulator, robot or the like, in which case a handle can be moved about two axes A and B which are perpendicular to one another. In this case, for the simulation, the handle can be pivoted about the axes via corresponding drives. However, it is also conceivable for the handle to be moved in a linear and/or

rotational manner. In the process, the movement of the actuating device or of the handle is effected in a positively controlled manner via the drive.

[0013] In particular for motion therapy, this positively controlled movement can be counteracted, for example, by means of a hand in order to carry out a certain therapy process.

[0014] In this case, the force, measured at any length of path, is freely selectable, in particular programmable, which force is to be applied in each case to the actuating device.

[0015] Furthermore, a sensor, in particular a force sensor, is assigned to the device, in particular the actuating device, this sensor exactly measuring the manually applied force when the actuating device is actuated from outside. A difference or a setpoint/actual-value comparison can be carried out via this force, it being established whether the force is sufficient in order to carry out the therapy process or whether the force is too small or decreases when considered over the therapy period or during the training, so that the active load can be adapted to the changing manually applied force.

[0016] In this case, the parameters, such as, for example, pulse and/or blood pressure, can be included in the training or therapy process.

[0017] In addition, it is advantageous in the case of the present invention that all the therapies or training sequences can be stored by a data acquisition system and, if need be, can be removed via a chip card, so that they are available again during the renewed training sequence or during the renewed therapy. A therapy or a training process can thus be optimized and influenced in a program-controlled manner.

[0018] In this case, for example, the simulation of the active load on the actuating device can be influenced in a program-controlled manner. Likewise, the parameters of speed of the actuating device and lengths of path which can accordingly be

covered by the actuating device can be influenced in a program-controlled manner. This electrically driven actuating device or active load is therefore suitable, since no complicated apparatus, items of fitness equipment with weights, or the like are necessary in order to carry out a certain sequence of movement.

[0019] These weights may be dispensed with; any desired number of intermediate sizes, different forces for different movements can be set at different lengths of path, which is not readily possible in the case of items of mechanical fitness equipment. In this case, each training or therapy sequence can be stored completely, which is likewise advantageous.

[0020] In addition, totally controlled motion training and/or therapy training and exact process monitoring are effected, which is advantageous.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Further advantages, features and details of the invention follow from the description below of preferred exemplary embodiments and with reference to the drawing, in which:

[0022] Figure 1 shows a schematic plan view of an arrangement for controlling a device;

[0023] Figure 2 shows a schematic elevation of the arrangement according to figure 1 with a multiplicity of connectable elements.

DETAILED DESCRIPTION

[0024] According to figure 1, an arrangement R_1 according to the invention for controlling a device 1, such as, for example, items of fitness equipment, items of equipment for motion therapy or the like, has an actuating device 2 which can be moved about

the axes X, Y and Z and/or along the axes X, Y and Z, as shown in the coordinate system.

[0025] The actuating device may be, for example, a joystick, a lever, a pedal or the like. There is no limit to the invention in this respect. The actuating device can be actuated, for example, manually by means of a hand or a foot, an arm or a leg of a human body or with the human body itself.

[0026] It permits a certain movement along the axes X, Y, Z in a rotational and/or linear manner, it being of crucial importance in the case of the present invention that the actuating device 2, for simulating an active load, can be driven by means of a drive 3 in a rotational and/or linear manner.

[0027] The drive 3 is preferably designed as an electric motor, in which case a gear unit 4 can be interposed or arranged in between actuating device 2 and drive 3.

[0028] Furthermore, it is of crucial importance in the case of the present invention that, for continuously and permanently detecting, in particular measuring, a manual force applied to the actuating device 2, a sensor 5, in particular a force sensor, is assigned to the device 1, in particular the actuating device 2.

[0029] If a manual force is applied to the actuating device 2, the force sensor 5 determines this manually applied force.

[0030] By the active simulation and movement of the actuating device 2 by means of the drive 3, which may be effected in a program-controlled manner, determinable and certain sequences of movement at a certain speed over certain lengths of path or at certain rotational angles being possible, freely selectable sequences of movement can be programmed and carried out.

[0031] To this end, for example, the patient can move the actuating device 2 via a "teach-in method", the movement being stored in a personal computer 6, see figure 2, and then the device 1, for simulating an active load, repeating this input movement, in particular this therapeutic movement of the

actuating device 2 to be executed, as often as desired via the drive 3.

[0032] The patient follows up this entire movement by means of his arm for example.

[0033] In this case, the user, with this movement, can counteract a manually applied force F , which is merely indicated symbolically in figures 1 and 2. For example, he can actuate the actuating device 2 with a determinable force, the arrangement R_1 , in particular the device 1, counteracting with this force via the drive 3.

[0034] The magnitude of the applied force can be determined exactly via the force sensor 5, it being possible to control and influence the movement by a comparison between setpoint and actual value after the manual force has been applied to the actuating device 2.

[0035] If the manual force applied to the actuating device 2 is too small in order to move the device 1, in particular the actuating device 2, in the programmed sequence of movement, the active load can be reduced in a program-controlled manner.

[0036] In this case, at the arrangement R_2 , as shown in particular in figure 2, a pulse sensor 7 or blood-pressure sensor 8, which is connected to the user, in particular the patient, may be connected to the personal computer 6 or to the device 1 in order to influence the control of the active load or the simulation of the active load and in particular the active actuation of the actuating device 2 via the drive 3.

[0037] If the pulse and the blood pressure increase to an undesirably high extent, the active load is automatically reduced or increased, in accordance with the desired and programmable sequence.

[0038] Furthermore, it is advantageous in the case of the present invention that the individual training sequences or therapy sequences can be stored, for example, in a data

acquisition system 9, in particular a data carrier, and, if need be, via an externally removable chip card 10.

[0039] A follow-up therapy or the follow-up training can thus be influenced with the aid of the stored data by virtue of the fact that the active loads for the follow-up training can be increased, reduced or changed or the corresponding movements of the actuating devices 2 can be adapted or modified. This is likewise to be within the scope of the present invention.